

## **Digital Eye-Witness Systems**

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### **HIGHWAY MOBILE ACCIDENT CAMERA**

According to the National Center for Health Statistics, "National Health Survey", in 1996 there were 35 million motor vehicle accidents with an associated total economic loss of \$120.8b. Approximately 60% of the \$120.8b was spent on claims payment and an additional 12% in legal fees. What is not known is how much of this amount was spent settling or defending fraudulent and frivolous claims. However, Loss Management Services, Inc. (LMS) does have a way to control these costs. LMS has developed systems to control claims pay out and litigation costs while deterring fraudulent and frivolous claims, along with providing for a real crash data bank for regulatory agencies.

LMS has developed the MAC (Mobile Accident Camera) Box system which will record the events leading up to an accident, capture accident data and record the aftermath. The MACbox will provide a "driver's eye view" of the entire incident from beginning to end. The only difference is that the MACbox will disclose without bias, the event as it occurred. The system is an application of existing commercial technology answering the most common and most vexing mystery: Whose fault was it? And, what happened? By working closely with our client companies, the insurance industry and our technology partners we will also establish a rich repository of information that will be used to help mediate claims, assign responsibility, advance vehicle safety and reduce the total economic loss that results from motor vehicle accidents.

The MAC Box system will be capable of providing benefit to the entire 200 million plus vehicles on the U.S. roads today. Unfortunately, like seat belts and anti-lock brakes, this system will take time to gain acceptance. Part of the problem is that the world does not change quickly and the insurance industry needs to accumulate actuarial data before they can offer financial incentives to change. Based on our research, the initial market will be the "Self- Insured Retention" (SIR) type risks. Between state and local governments, along with private fleets, this represents a market of over 9 million vehicles. With two years of data and some direct involvement with selected insurance industry partners, we believe that we can establish the statistical and business basis for these insurance companies to offer incentives to their clients that purchase our product.

We have been in contact with the National Highway Traffic Safety Administration and they have formed a committee with representatives from the major automotive manufacturers, the insurance industry, universities and medicine to develop a standard for a less aggressive product that will only capture motion information and contact the emergency services. The NHTSA has expressed a strong desire to have us present our solution to this august body. Most recently, we had the opportunity to do so at NHTSA's

EDR Working Group. LMS is now apart of that group and is currently involved with identifying issues to make clear what is needed within the EDR environment.

Future versions of our product will have added functionality and reduced unit costs expanding coverage to the total motor vehicle market. We envision a MACbox fitting in the rear view mirror of every automobile and providing the ability to not only see and record accidents, but to contact police and pass important medical information to emergency medical technicians that are responding to the call. Additionally, the real world accident data gathered will be of great value to both the Federal Government, local law enforcement and car manufacturers in improving vehicle safety systems, along with an accurate assessment of highway infrastructure conditions. The foundation has been laid for making this vision a reality. A prototype is complete. LMS has entered into marketing, manufacturing, and technology partnerships with industry leaders to ensure that there will a 'best of breed' in developing the system for commercialization.

## **The Market**

LMS will direct market the MACbox to insurance companies, long and short haul trucking companies, charter bus companies, car and truck rental companies, corporate fleet and limousine companies, along with municipal transit authorities and taxi and limousine exposures. According to the 1996 FARS/GES published Report, the number of vehicles in operation at that time was:

124.6 million Passenger cars

65.4 million light trucks (includes vans and utility vehicles)

7.4 million large trucks

The vehicle base is growing at a rate of 2% plus annually.

The initial target market will be commercial and rental vehicles. The estimate of this market alone is in excess of 25 million vehicles. With the second phase of the product, we will have a cost-effective solution for the private passenger vehicles. This will expand the market to the total population of vehicles in operation.

## ***Insurance Companies***

LMS will develop strategic alliances with the top five insurance carriers in the United States. The purpose of the alliances will be to develop a database of information regarding claim cost reduction and its relation to premium discounts. To date, discussions have begun with Allstate, Geico, State Farm, Liberty Mutual and Prudential Property and Casualty.

## ***Long and Short Haul Trucking***

Long and short haul trucking companies often provide a portion of their liability protection through Self-Insured Retention (SIR). Within the SIR marketplace, the insured typically assumes liability up to a predetermined limit. In the case of long haul truckers this may be the first \$500,000 per occurrence. It is in their best interest to limit their exposure to long and costly claims management and potential litigation. With the MACbox, those companies would have an expert witness with each of their vehicles. In

the event of an accident, the information provided could be used to help limit the overall expense involved with the claim, along with providing for future safer routes.

### ***Charter Bus Companies***

Charter bus companies such as Laidlaw/Greyhound represent a significant potential market for LMS. These companies provide much of their own liability protection with SIR, and have tremendous potential exposure for personal injury claims. These operators are looking for proactive technology solutions to limit their roadway exposure. LMS plans to modify the MACbox to record accident information within the bus to help determine personal injury exposure.

### ***Car and Truck Rental Companies***

These companies represent a tremendous opportunity for LMS. The likelihood of having a driver involved in an accident return to testify during litigation is very low considering that most drivers are from out of state. This presents a very difficult situation for the legal departments of the rental companies. They are often presented with indefensible claims and settle more claims than they would have to if they were to incorporate a MAC box in each vehicle.

### ***Corporate fleet and Limousine Companies, Municipal Transportation Authorities and Taxi and Limousine Commissions***

These potential customers represent a tremendous potential for LMS since they all involve operators for hire. The representative management involved with these risk exposures has a vested interest in maintaining the safety of the vehicles and their passengers. The ability to have an expert 'Digital Eye-Witness' available at the scene of every accident is an invaluable tool to these management teams. Both management and legal council will benefit from the information provided. They will be provided with information necessary to determine whether to litigate or settle as well as determine whether to terminate the employment of operators. LMS is presently in discussions with the New York City taxi & Limousine Commission.

### ***Private Passenger - Transportation - Vehicles (PPV)***

The MACbox provides a unique method of reducing accident claim expenses incurred by insurers as well as those companies providing liability protection via Self Insured Retention (SIR). A 1996 report by the Insurance Information Institute stated that the entire vehicular insurance market incurred \$120.8 billion in losses during 1996. According to their data bank 6,115,000 private passenger motor vehicle (PPV) accidents were reported nationwide in 1996. This equates to \$77.7 billion dollars in losses for the PPV's alone. These costs represent the total claim expense and settlement costs absorbed by PPV insurance companies. These costs could be drastically reduced if the extent of litigation were reduced. The MACbox acts as a 'Digital Eye-Witness' to the occurrence of a crash and removes any doubt as to which driver is at fault. This information will allow the insurers to immediately evaluate their exposure and decide whether settlement of the claim is in order. The impact of clearly establishing fault via video recording of the accident will drive the insurance companies to participate in this program.

### ***Self Insured Retention (SIR)***

Within the SIR market we have identified the following vehicular populations:

Long/Short Haul Trucking 800,000

Light Trucks 1,200,000

Buses (private charter/school) 500,000

Municipal (State & Local) 7,500,000

PPV (rental cars/fleet vehicles) 1,500,000

Taxies 3,500,000

**Total 16,000,000**

### ***Future Vision***

#### *Data Bank:*

LMS will create and manage a database of image and crash data for use in determining roadway safety by Government agencies and the private sector.

#### *Civil Court Database:*

LMS will provide for data transmission to the courts for automatic denial or a lack of causation of the Plaintiff regarding the liability portion of the action. That is, to determine, without jury selection, the validity of Plaintiff's case.

#### *Trucker's Log:*

The next generation of the MACbox will incorporate a "trucker's log" necessary in long haul trucking. The system will use accelerometer data to determine the movement and stationary positions of the truck. Trucker's logs are currently mandated by the Department of Transportation (DOT) and are used to determine a driver's activity.

#### *Elevator MACbox:*

Piloting commercial buildings with the MACbox within an elevator to capture sudden acceleration. The sudden drop or acceleration will cause the system to capture images within the elevator cab to determine the potential injury to any occupants. The Elevator MACbox can be used to indicate required maintenance.

### ***Partners:***

LMS has two partners that are currently committed to working on the development of the beta version of the first MACbox system. The parties and their component of the solution is as follows:

Phoenix Group Inc.

Instrumented Sensor Technology  
Kodak

Specialized PC with Ruggedized enclosure and  
System Integration  
Shock and Motion Sensors and Trigger  
Image/Data Repository

### **Major Contacts**

### ***Targets for the Pilot Program***

During our conversations with numerous organizations, some have expressed interest in being part of the initial 600 unit pilot program. They are:

Allstate Insurance

Avis Rental

New York City, NY MTA & Long Island, NY MTA

John Deere Insurance Services

### ***Insurance Industry Interest***

A key to the success of the MAC Box system will be the acceptance by the insurance industry. Our measure of their acceptance will be their premium discounts for the installation of our product. While we are a couple years away from that level of acceptance, a number of insurance companies, transportation companies and agencies have expressed strong interest in working with us on this project. They are:

Allstate Insurance

Prudential P&C of New Jersey

John Deere Insurance Services

State Farm Insurance

Liberty Mutual Insurance Company

Office of Safety Performance Standards – NHTSA Research

NY MTA Buses - Fleet of 3,900 units

NYC Taxi & Limousine Commission - 12,000 units

UPS - Fleet size - 164,000 units

AVIS Rental – 500,000

Enterprise Rental - 400,000

Greyhound/Laidlaw – 43,000

Northeast Trucking – 4,300

### ***Current Service Offerings***

LMS will offer a number of services that make use of the information developed by the MACbox or support the system. After we have developed the business with these foundation services we will expand the service offerings to include video recreations, expert witness testimony and arbitration services. As we move forward with the MACbox, the company is confident that we will find additional products and services that we can offer from the information that we collect.

### ***Installation Services***

LMS will offer our clients installation services with the new systems. Our organization will develop an installation process document that can be used by a local vendor to install the MACbox system into the vehicle and test the unit after installation. We intent to contract with electronic equipment installers that are local to our clients to make the process as convenient as possible for them. The initial installations will be performed under our supervision. The knowledge gained from these efforts will be incorporated into our process documentation. As part of the installation process, we will develop a remote certification procedure that will allow us to test the system prior to placing it into service.

### ***Membership Fee***

All users of the MACbox system will be charged an annual user fee. This fee will cover the maintenance of vehicle records containing, VIN number, owner, address and other user defined fields such as primary driver on our roster, quarterly remote testing of the MACbox to ensure that it is functioning properly and support from our help desk on the unit. The membership fees will be assessed per vehicle.

### ***Accident Reports***

LMS will provide accident reports for our clients. The information taken from the MAC box system will remain the property of LMS and users of that information will be required to purchase the information from us in the form of an "Accident Report". These reports will be available in both a hard copy format and an electronic format that will be accessible over a secure link to the Internet. The reports will be generated by LMS and moved from our internal repository to a customer repository that is managed using a sophisticated image and data management system. A security system will be used that ensures compliance with local, state and federal law related to defendant and plaintiff access to information. Billing for the reports accessed via the Internet will be automatic and clients will receive a monthly statement for usage. While the electronic access vehicle will be the most efficient way for our clients to receive accident information, certain clients may require hard copy. For those clients, a printed version of the report, including video images will be available. The accident report will contain all information from our data repository including vehicle information, time and date detail on the accident, the entire image file containing approximately 300 images and the motion data. The images will be taken at 10 frames per second for 15 seconds before and after the accident and the motion data will be saved for the same period of time. The motion information will track changes in velocity on two axes for the vehicle.

### ***Future Services:***

#### **Video Accident Recreations:**

Using a combination of the video images, motion information and computer based animation tools, LMS will be able to produce a video recreation of the accident from multiple angles. These recreations will incorporate the live video images where appropriate and augment the live video with animation to recreate the entire incident.

#### **Expert Witness Services:**

LMS will develop a network of "Expert Witnesses" from the ranks of educational institutions and industry that will be available for testimony in accident related cases. This network will span the country using individuals with the appropriate professional credentials to assist in explaining the physical characteristics of the accident and their professional opinion on the dynamics of the incident. LMS will contract with our clients for these services and retain the network of expert witnesses on our staff, as consultants that are compensated on an as needed basis.

#### **Accident Arbitration Services:**

LMS will offer arbitration services that will allow the parties involved in an accident a means outside of the court system to resolve accident related claims. Drawing on the

information collected at the time the accident occurred, we will employ professional arbitrators to mediate cases using information taken from our repository.

## **The Products**

### **'Product' Overview**

With our partners, LMS is developing the Mobile Accident Camera (MAC) Box. LMS will provide these systems, which *Capture and Secure* 'driver's eye view' images and telemetry data prior to, during and immediately after an actual accident; *Manage* this data, including chain of custody; and *Distribute* the data, through the use of emerging digital and communications technologies.

By taking a component approach toward the development of the MACbox, LMS leverages the individual expertise of industry leaders to build a 'best of breed' solution. Partnered with Instrumented Sensor Technologies Inc. and Phoenix Group Inc. LMS will develop and manufacture the lowest cost, most reliable system for recording storing and transmitting accident data.

Within the MACbox resides a digital video camera as well as circuitry and software to:

- 'Sense' when an accident has occurred
- Capture video and telemetry data prior to, during and immediately after an accident
- Store and lock accident image and telemetry data after an accident
- Upload accident image and telemetry data to wireless networks
- Download accident image and telemetry data to a portable computer

The MACbox is made up of five functional components:

- 1) Digital Video Camera utilizing a real-time software video compression engine - licensed through Phoenix Group, Inc. ([www.ivpgi.com](http://www.ivpgi.com))
- 2) IST biaxial accelerometer and 'trigger' system - developed by Instrumented Sensor Technology, Inc. ([www.isthq.com](http://www.isthq.com))
- 3) Transceiver (vendors under evaluation)
- 4) CPU including system and flash memory as well as related interface circuitry for the other system components. The x86 CPU operating system is Windows CE. - System developed by Phoenix Group, Inc.
- 5) Power Supply and Battery Backup - developed by Phoenix Group, Inc.

Phoenix Group will provide the integration of all of the components with the digital video camera subsystem, CPU and power supply. PGI will be responsible for final assembly and testing.

### **Functional Overview**

The MACbox continuously records: a) Video data in a software 'video loop' from the driver's point of view and b) Acceleration in two axis at a sampling rate of 2000 times per second. When an accident occurs, the IST subsystem 'senses' that accident signature parameters have been matched or exceeded. This event 'triggers' the CPU to permanently store a video sequence which encompasses a definable period of time before and after the accident. The MACbox then transmits the video and accelerometer data that was acquired during and after the accident through the Motorola cellular transceiver. The MACbox then encrypts and 'locks' this data to prevent tampering. The result is a group of images and associated data transmitted by the MACbox, immediately after the accident has occurred, to a secure server.

The system allows a crash investigator, or other authorized party to see the crash develop before and after the impact from the driver's perspective. Accelerometer and video data are time-stamped to allow a complete re-creation of the crash. This data set will facilitate an accurate reconstruction of the crash.

The use of a personal computer based system will allow us to enhance the systems to include multiple cameras, driver monitoring and the other related features.

#### System Programmability

The system software embedded within the MACbox is programmable and can be tailored to the particular vehicle or application. System parameters including system thresholds and the number of images taken prior to, and immediately after, an accident can be altered to meet the requirements of a particular application.

*For instance, if the default setting allows for the capture of images for 30 seconds prior to an accident and for an additional 30 seconds after the accident but then it is determined that it is advantageous to have more images before the accident than after, the system can be re-programmed to store 48 seconds worth of images prior to the accident and only 12 seconds after.*



## **Engineering Requirements**

The following companies are supplying and integrating the components of the MAC box system.

### **The Phoenix Group, Inc.**

PGI, formed in 1994, is comprised of a cadre of highly skilled engineering and management personnel who have worked together for more than twenty years. Lead by Dick Pandolfi, this team built Miltope Corp. from a 1975 start-up into a 100 million dollar a year company. Under the auspices of Mr. Pandolfi, PGI is dedicated to the design and development of rugged, truly portable miniature computer systems.

The comprehensive PGI product line has been designed for demanding industrial and military field applications, where performance under harsh environmental conditions is essential. PGI products are ideally suited for vehicle, aircraft, shipboard and outdoor field applications.

PGI will design and manufacture a custom variation of one of their standard products to meet LMS's specifically defined criteria. PGI has years of experience integrating systems for end user application for their traditional customer base including OEMs (Original Equipment Manufacturers), VARs (Value Added Resellers) and Systems Integrators.

PGI's customers include Fortune 500 Companies, the U.S. Department of Defense as well as Foreign Ministries of Defense. PGI's Design capability coupled with its in-house automation offers LMS a source of quick prototyping and unique customizing skills. PGI's in-house integrated facility includes AutoCad supported by CAM, allowing quick and efficient conversion from design to final product. A modern, automated NC sheet metal and machining capability is combined with in-house mold making and injection molding capability. This will allow us to use the most cost effective and superior space age high strength carbon filled materials, pliable rubber and plastics in all LMS designs.

### **Instrumented Sensor Technology, Inc.**

IST, celebrating its 10th year in the business, is an industry leading high-technology instrumentation company focused on developing innovative products for field measurement and data recording. The company specializes in development of physically compact, high performance digital data acquisition and recording systems for high-speed mechanical measurements.

IST's mission is to provide high quality, high reliability data recording products and software at reasonable cost, and supported with high-level customer and applications support and service. The company's products are used widely in such applications as transportation measurement, packaging and handling shipment monitoring and recording,

automotive shock and vibration testing, crash recording, airborne vibration measurement, accident re-construction, and many others.

IST offers a unique source of expertise and industry experience. They will design and manufacture a custom variation of one of their standard products to meet LMS's specifically defined criteria.

### **Media Motion, Inc**

Media Motion is a private company developing video systems for the commercial market. They have developed what we consider the most appropriate real-time video compression systems and related applications for Loss Management Services products.

By leveraging the individual strengths of each partner, LMS will be able to offer its customers best-of-breed solutions at a competitive price. And the fact that each of these partners is a technology leader in their respective areas makes their support of the start-up company that much more significant.

### ***Engineering***

All existing system components were originally developed for the mobile computing/data recording market. For this reason, the completion of a prototype and ensuing production is less of a development process than a re-engineering and integration of components used in the Proof of Concept. The component suppliers are leading development, engineering and manufacturing firms in their particular markets. The greatest challenge is the re-engineering - for cost reduction and ease of integration - of LMS partner components and the development of the proper triggering thresholds.

Proof of Concept (began July 15, 1998; ended January 1, 1999)

Sept. 15, 1998 - Media Motion installs XX on PGI Nightingale

PGI interfaces IST box

Oct. 1, 1998 - PGI interfaces Media Motion software and IST EDR-3 box

Dec. 7, 1998 - IST tunes integrated system

March 5, 1999 - Product Demo

Prototype Stage (began December 30, 1998; end April 30, 1999)

1) Requirement Analysis (began September 30, 1998; end October 30, 1998)

b) Determine System Specifications

i) Enclosure: ruggedized/environment/construction/X and Y-axis orientation/mounting

ii) Camera (shock dampening, windshield mount, operational light level, resolution)

iii) Cabling (connection specifications)

iv) Upgradeability

v) Extensibility

- vi) Real-time Operating System Requirements
  - Startup requirements
  - Shutdown requirements
  - Diagnostics - remote monitoring, fault detection/prediction
- vii) XY Sensitivity
  - trigger threshold waveform development
- viii) Video Memory:
  - Resolution and 'frame-rate'
  - X Seconds before
  - Y Seconds after
- ix) Power supply requirements
  - Main Power
  - Battery Backup

2) Prototype development and testing (begin development March 15, 1999 - April 30, 1999)

- a) Re-engineering of system components
- b) Re-engineered system component integration

Beta Test Stage May 15, 1999 – August 30, 1999

600 Units placed in various vehicle types for data collection and testing.

Preferably Buses, Trucks and Private Passenger Commercial Fleet Vehicles.

- a) Re-engineering of system components
- b) Re-engineered system component integration

First Revenue Ship November 1, 1999

By working closely with the transportation industry, insurance companies and our technology partners, we will establish a rich repository of information that will be used to help mediate insurance claims, insurance fraud, assign responsibility, advance vehicle safety and reduce the total economic loss that results from motor vehicle crashes. The System will finally answer the most vexing mystery: What happened? And, whose fault was it?

#### References

1. Phoenix Group, Inc./[www.ivpgi.com](http://www.ivpgi.com)
2. Instrumented Sensor Technology, Inc./[www.istq.com](http://www.istq.com)

## **Management Team**

### ***John J. Mackey***

Chief Executive Officer and Founder of the MACbox - Mobile Accident Camera

John Mackey, 41 years old and residing in Lindenhurst, New York. John graduated from Slippery Rock University, PA, with a Bachelor of Science in Education. John has been in the insurance industry since 1980 starting out his insurance carrier with The Hartford Insurance Group. Thereafter, John became a police officer and developed an appreciation for both crash aided victims and response time to emergency calls. John then returned to the insurance industry, and has been involved in property and casualty claims since and worked for such companies as Liberty Mutual Insurance, American International Group, two independent claim companies, and President of Loss Management Services, Inc. (LMS). John currently holds a New York State Independent Adjuster's license under LMS.

### ***Stephen Ingalls CPA***

President

Mr. Ingalls 44 years old, and residing in Centerport New York. Stephen is currently the president of Wilsearch Information Network, Inc. a public records research company that provides their clients with information from across the country. As part of his role in Wilsearch he designed, developed and implemented all of the computer systems that are currently in use at the company for report production, order entry, billing and financial management. In addition to working with Wilsearch, he has 16 years with Digital Equipment Corporation in the capacity of a consultant, finance manager and programmer. Stephen is a member of the American Institute of Certified Public Accountants. He holds a Masters in the Science of Finance from Bentley College and a Bachelor of Business Administration from the University of Massachusetts.

### ***Edward J. Bates***

Vice President of Marketing

Mr. Bates, 38, and residing in New York City, New York is president of First National Services, Inc. where he is responsible for the company's development, marketing and sales of various insurance products. In addition, Mr. Bates has provided consulting services in the areas of Business Development, Marketing and Sales, and Financial Advisory to many high technology start-up ventures, which have been involved in various areas of computer hardware and software development. Prior to holding his position with First National Services, Inc., Mr. Bates was a Senior Computer Design Engineer with the Grumman Corporation for eight years. His responsibilities included the management of subcontractor hardware/software integration and test, system/software design and compliance, the development of system and software performance specifications, and the

development and scheduling of hardware, software and system tests. Mr. Bates holds a Master of Business Administration from Columbia Business School and a Bachelor of Science in Electrical Engineering from Polytechnic University.

***Christopher J. Brogan***

Vice President of Technology

Mr. Brogan, 38, and residing in Fulton, California has a broad background with high technology ventures in startup and growth phases. He has provided business development; engineering requirements analysis and definition; and sales and marketing consulting. Mr. Brogan's engineering background and experience in developing sales channels and strategic alliances with industry leaders such as Sun Microsystems, Oracle, Informix and IBM will provide LMS with additional expertise in selling and marketing LMS's strategic systems into our target markets. Prior thereto, Mr. Brogan served as a United States Naval Aviator for over eight years. His various responsibilities included: Strike Syllabus Instructor Pilot, Electronic Warfare Officer, Squadron Systems Training Officer, and Program Development Officer. After graduating Manhattan College with a Bachelor of Science in Electrical Engineering and now enrolled in Columbia University's Executive MBA Program., he held positions as a software engineer at Nippon Electric Corporation and hardware/software design engineer at Lucas Aerospace Corporation.

***Jack Howlett***

Vice President of Sales

Mr. Howlett, 42, residing in Farmingdale, New York and brings 20 years of property and casualty claims experience to LMS. As a licensed General Adjuster, Mr. Howlett has spent his entire career providing nationwide independent claims adjustment and third party administrative services to self insured corporations in both the municipal and private sectors as well as insurance carriers. In 1989, Mr. Howlett founded and was named CEO of Network Adjusters, Inc. Currently, Mr. Howlett is President of Precise Claims Administrators, Inc., which services third party claim administration for municipal accounts. He was elected President of the New York Association of Independent Adjusters, and is a member of the New York Claims Association and the National Association of Insurance Adjusters.